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ABSTRACT

According to 1986 U.S. Department of Energy data, 48% of our residential energy is used to heat and cool our homes, 16% goes for heating water, 12% is used to refrigerators and freezers, and the remaining 24% goes into lighting, cooking, and running appliances. This booklet contains tips for saving energy, including sections on: (1) draft-proof windows, doors, and other air leaks; (2) insulation; (3) heating energy savers; (4) cooling energy savers; (5) energy-efficient ratings for air conditioners; (6) water heaters; (7) kitchen energy savers; (8) laundry energy savers; (9) lighting energy savers; (10) appliance energy savers; (11) the appliance labeling program; (12) buying or building a home; and (13) yard and workshop savers. Also included are tips regarding energy conservation in buying and using a car. (TW)

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Tips for Energy Savers

DOE/CE-0143
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U.S. Department of Energy
Washington, D.C. 20585

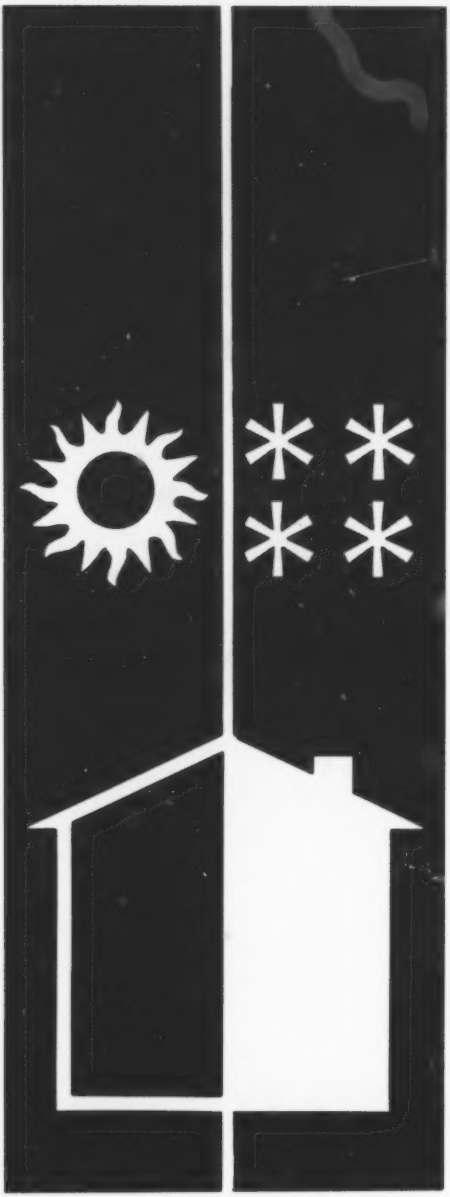
How to Save Energy and $$$ . . . At Home

Much of our residential energy, 48 percent, is used to heat and cool our homes. An additional 16 percent goes for heating water, the second-largest individual home energy user and expense. Refrigerators and freezers use 12 percent. The remaining 24 percent goes into lighting, cooking, and running appliances.

We can cut our energy use and help control living costs by making our homes energy efficient, even if we have to spend some money to do it. The money we spend now can help hold down energy costs.

Caution: Some older people may require higher indoor temperatures—above 65°F at all times—to avoid accidental hypothermia, a possibly fatal drop in body temperature. People with circulatory problems or those taking certain types of drugs (e.g., phenothiazines, commonly used to treat anxiety and nausea) may also be vulnerable. In such instances, follow a physician's counsel on both winter and summer thermostat settings in your home.

Protect Your Home From Outside Heat and Cold



Millions of single-family homes in the United States still are not adequately protected from outside weather, according to Department of Energy estimates.

Here are some tips to make sure yours is not one of them.

Draft-Proof Windows, Doors, and Other Air Leaks

- **Test your windows and doors for airtightness.** Move a lighted candle around the frames and sashes of your windows. If the flame dances around, you need caulking and/or weatherstripping.
- **Caulk and weatherstrip doors and windows.** It's easy to do yourself. Caulking and weatherstripping materials cost about $25 for the average house (12 windows, 2 doors). Savings in annual energy costs could amount to 10 percent or more.
- **Look for other airleaks** through walls or ceilings. Close fireplace dampers; seal cracks or holes; fill gaps in insulation.

If every gas-heated home were properly caulked and weatherstripped, we'd save enough natural gas each year to heat about 4 million homes.

- **Install storm windows.** Combination screen and storm windows (triple-track glass combination) are the most convenient and energy efficient because they can be opened easily when there is no need to run heating or cooling equipment.

  Alternatives range from a heavy-duty, clear plastic sheet on a frame (about $10-$15 each), to clear plastic film which can be taped tightly to the inside of the window frames (a total of about $10 for the average home).

  Savings in reduced space heating costs for any of these types of protection can amount to as much as 15 percent a year. Adding storm doors in very cold or very hot climates could increase these savings.

Insulate

No matter how you heat or cool your home, you can reduce the load on your heating and cooling equipment by as much as 20 to 30 percent by investing a few hundred dollars in insulation. The benefits of insulation—lower utility costs—continue for years.

- **Find out if your home needs insulation.** Your needs will depend on the climate in which you live and the amount of insulation, if any, you already have. For guidance, consult with a reputable insulation dealer in your community or with your local building inspector or county agent.

- **Find out about R-values** before you buy your insulation materials. Then buy the thickness of insulation that will give you the R-value you should have. (See Heating Zone Map, page 14.)

  R-values or numbers indicate the resistance of an insulation material to winter heat loss or summer heat gain. The higher the R-number, the more effective the insulating capability. The numbers should appear on packages of all insulation materials: mineral, glass fiber, or rock wool batts or blankets; foam or loose fill materials that are poured or blown into insulation spaces; or rigid board insulation.

  If the insulation you buy doesn't have the R-value written on the package, ask the salesperson to write the R-value on your receipt for future references.

  Sources for R-value information include: Department of Energy; National Bureau of Standards, U.S. Department of Commerce; American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE); and insulation manufacturers.

- **Insulate your attic floor or top floor ceiling** to a minimum of R-26 for these spaces.

  If you have old insulation in your attic, you probably won't be able to judge its R-value. But if you have 3

inches or less of old insulation, chances are you need more to bring the insulation level up to the recommended level. (See the heating zone map for guidance.)

Investment costs could range from $100 to $1,000. Heating and cooling savings should range from somewhere around 5 percent, if you are adding to present insulation, to as much as 30 percent if you have no insulation.

- **Don't insulate over eave vents or on top of recessed lighting fixtures or other heat-producing equipment on the attic floor.** Also, keep insulation at least 3 inches away from the sides of these types of fixtures.

- **Consider insulating exterior walls.** This is an expensive measure that requires the services of a contractor, but it may be worth the cost if you live in a very hot or very cold climate. There should be enough space in the walls to accommodate blown-in insulation that is at least R-11 to R-13 in most construction except masonry.

  Costs range from 30 cents to $1.65 per square foot. Savings could amount to 16 to 20 percent of utility costs.

- **Insulate floors over unheated spaces** such as crawl spaces and garages.

- **Avoid unwanted moisture buildup** caused by faulty installation of insulation. Follow the instructions on the product, or obtain instruction from your insulation supplier on the correct method of installation and any needed ventilation.

  Costs could range from $200 to $400. Savings could amount to about 8 percent on your heating and cooling costs.

Heating and Cooling

Heating and cooling our homes account for about half of our residential energy costs. Don't waste any of that precious conditioned air, whether you pay for it yourself or pay your landlord for it.

During both heating and cooling seasons . . .

- **Clean or replace filters regularly.** Keep outside units free of leaves or debris that may clog vents.
- **Close off unoccupied rooms** and shut their heat or air-conditioning vents; or turn off room air-conditioners. (This does not apply if you have a heat pump system. Leave it alone; shutting vents could harm a heat pump.)
- **Use kitchen, bath, and other ventilating fans sparingly.** In just 1 hour these fans can blow away a houseful of warmed or cooled air. Turn them off just as soon as they have done their job.
- **Keep your fireplace damper closed unless you have a fire going.** An open damper in a 48-inch square fireplace can let up to 8 percent of your heat out the chimney.

Heating Energy Savers

Don't turn the heat on until you have to. On cool evenings use your fireplace instead and add a blanket at night.

With heating equipment . . .

- **Keep your heating equipment well tuned** with periodic maintenance by a professional serviceman. Ask the serviceman how the energy efficiency of the heating system can be increased.
- **If you plan to buy a new furnace,** select an energy efficient unit. Your contractor has energy factsheets for each model; ask for them and compare energy usage.
- **If you use electric furnace heating, consider a heat pump system.** The heat pump uses thermal energy from outside air for both heating and cooling. Costs for heat pumps run from about $2,000 for a whole-house unit to about $425 for room size. But they can cut your use of electricity for heating by 30 to 40 percent and also might provide some savings in cooling costs.
- **If you plan to buy a new gas heating system,** ask your gas utility or public service commission about the savings potential of electronic ignition. Ask also about possibilities for retrofitting the system you may already own.
- **Consider the advantages of a clock thermostat for your heating system.** The clock thermostat will turn the heat down for you

automatically at a regular hour before you retire and turn it up again before you wake. While you can easily turn your thermostat back at night and up again in the morning yourself, the convenience of a clock thermostat may be worth the $40 to $90 cost to you.

- **Consider buying a properly sized furnace that incorporates an automatic flue gas damper.** This device reduces the loss of heat when the furnace is off. (Contact your gas utility or oil supplier for guidance.)
- **Insulate accessible heating ducts in unheated areas.**
- **Don't use your fireplace for supplemental heating when your furnace is on** unless you take one of the measures suggested below to lessen the loss of heated air from the house.

  The warmth from a fire on the hearth generally doesn't radiate through the house; the heat gain is confined to the room with the fireplace. And when your furnace is on, too, a considerable amount of heated air from the rest of the house flows into the fireplace and goes wastefully up the chimney. Then the temperature in other rooms of the house goes down, and the furnace uses more fuel to raise it to the level controlled by the thermostat. So you use more fuel rather than less, when the furnace and fireplace are both going.
- **Lessen heat loss if you use your fireplace when the furnace is on:**

  — **Lower the thermostat setting to between 50°F and 55°F.** Some warmed air will still be lost, but the furnace won't have to use as much fuel to heat the rest of the house to these temperatures as it would to raise the heat to 65°F. (Note: See Caution on page 1.)

  — **Close all doors and warm air ducts entering the room with the fireplace, and open a window near the fireplace about ½ to 1 inch.** Air needed by the fire will be provided through the open window, and the amount of heated air drawn from the rest of the house will be reduced.

  — **If you have a simple open masonry fireplace, consider installing a glass front or a glass screen.** This will cut down on the loss of warmed air through the flue.

  When the heat is on . . .

- **Lower your thermostat to about 65°F during the day and 60°F at night.** You can save on your fuel costs for every degree you reduce the ***average temperature*** in your home. (Note: See Caution on page 1.)
- **Keep windows near your thermostat tightly closed,** otherwise it will keep your furnace working after the rest of the room has reached a comfortable temperature.
- **Have your oil furnace serviced at least once a year,** preferably each summer to take advantage of off-

season rates. This simple precaution could save you 10 percent in fuel consumption.

- **Clean or replace the filter in your forced-air heating system each month.**

- **Check the duct work for air leaks about once a year if you have a forced-air heating system.** To do this, feel around the duct joints for escaping air when the fan is on.

  Relatively small leaks can be repaired simply by covering holes or cracks with duct tape. More stubborn problems may require caulking as well as taping.

- **If you have oil heat, have your service man check to see if the firing rate is correct.** Chances are it isn't. A recent survey found that a large majority of the furnaces checked were over-fired.

- **Don't let cold air seep into your home through the attic access door.** Check the door to make sure it is well insulated and weatherstripped, otherwise you'll be wasting fuel to heat that cool air.

- **Dust or vacuum radiator surfaces frequently.** Dust and grime impede the flow of heat. And if the radiators need painting, use flat paint, preferably black. It radiates heat better than glossy.

- **Keep draperies and shades open in sunny windows; close them at night.**

- **For comfort in cooler indoor temperatures, use the best insulation of all—warm clothing.**

  The human body gives off heat, about 390 Btu's per hour for a man, 330 for a woman. Dressing wisely can help you retain natural heat.

  Wear closely woven fabrics. They add at least a half degree in warmth.

  For women. Slacks are at least a degree warmer than skirts.

  For men and women. A light long-sleeved sweater equals almost 2 degrees in added warmth; a heavy long-sleeved sweater adds about 3.7 degrees; and two lightweight sweaters add about 5 degrees in warmth because the air between them serves as insulation to keep in more body heat.

If every household in the United States lowered its average heating temperatures 6 degrees over a 24-hour period, we would save more than 570,000 barrels of oil per day.

Cooling Energy Savers

Overcooling is expensive and wastes energy. Don't use or buy more cooling equipment capacity than you actually need.

Regarding air-conditioning equipment . . .

- **Keep your cooling system well tuned** with periodic maintenance by a professional serviceman. Ask the serviceman how the energy efficiency of the system may be increased.

- **If you need central air-conditioning, select a unit with the lowest suitable capacity and highest efficiency.** A larger unit than you need not only costs more to run but probably won't remove enough moisture from the air. A more efficient unit will cost less to operate.

  Ask your dealer to help you determine how much cooling capacity you need for the space you have to cool and for the climate in which you live.

- **Make sure the ducts in your air-conditioning system are properly sealed and insulated,** especially those that pass through the attic or other uncooled spaces.

- **If you don't need central air-conditioning, consider using individual window or through-the-wall units** in rooms that need cooling from time to time. Select the lowest capacity and highest efficiency for the rooms you need to cool. As a rule, these will cost less to buy and less to operate than a central system.

- **Install a whole-house ventilating fan** in your attic or in an upstairs window to cool the house when it's cool outside, even if you have central air-conditioning.

  It will pay to use the fan rather than air-conditioning when the outside temperature is below 78ºF. When windows in the house are open, the fan pulls cool air through the house and exhausts warm air through the attic. Two smaller window fans also will help cool the house when the air cools down outdoors.

When you use air-conditioning . . .

- **Set your thermostat as high as possible.** 78ºF is often recommended as a reasonably comfortable and energy-efficient indoor temperature.

  The higher the setting and the less difference between indoor and outdoor temperature, the less outdoor hot air will flow into the building.

  If the 78ºF setting raises your home temperature 6 degrees (from 72ºF to 78ºF for example), you should save between 12 and 47 percent in cooling costs, depending on where you live.

- **Don't set your thermostat at a colder setting than normal when you turn your air-conditioner on.** It will NOT cool faster. It WILL cool to a lower temperature than you need and use more energy.

- **Set the fan speed on high except in very humid weather.** When it's humid, set the fan speed at low; you'll get less cooling, but more moisture will be removed from the air.

- **Clean or replace air-conditioning filters at least once a month.** When the filter is dirty, the fan has to run longer to move the same amount of air, and this takes more electricity.

- **Turn off your window air-conditioners when you leave a room for several hours.** You'll use less energy cooling the room down later than if you had left the unit running.

- **Consider using a fan with your window air-conditioner** to spread the cooled air farther without greatly increasing your power use. But be sure the air-conditioner is strong enough to help cool the additional space.
- **Don't place lamps or TV sets near your air-conditioning thermostat.** Heat from these appliances is sensed by the thermostat and could cause the air-conditioner to run longer than necessary.

With or without air-conditioning . . .

- **Keep out daytime sun** with vertical louvers or awnings on the outside of your windows, or draw draperies, blinds, and shades indoors.
- **Keep lights low or off.** Electric lights generate heat and add to the load on your air-conditioner.
- **Do your cooking and use other heat-generating appliances in the early morning and late evening hours whenever possible.**
- **Open the windows instead of using your air-conditioner or electric fan** on cooler days and during cooler hours.
- **Consider turning off the furnace pilot light** in summer, but be sure it's reignited before you turn the furnace on again.
- **Dress for the warmer indoor temperatures.** Neat but casual clothes of lightweight open-weave fabrics are most comfortable.

  A woman will feel cooler in a lightweight skirt instead of slacks. A man will feel cooler in a short-sleeved shirt than in a long-sleeved shirt of the same weight fabric.

Without air-conditioning . . .

- **Be sure to keep windows and outside doors closed during the hottest hours of the day.**
- **Use window or whole-house ventilating fans to cool the house when it's cool outside** (see preceding page for more information about whole-house fans).
- **Use vents and exhaust fans** to pull heat and moisture from the attic, kitchen, and laundry directly to the outside.

If everyone raised air-conditioning temperatures 6 degrees, we'd save the equivalent of 190,000 barrels of oil everyday.

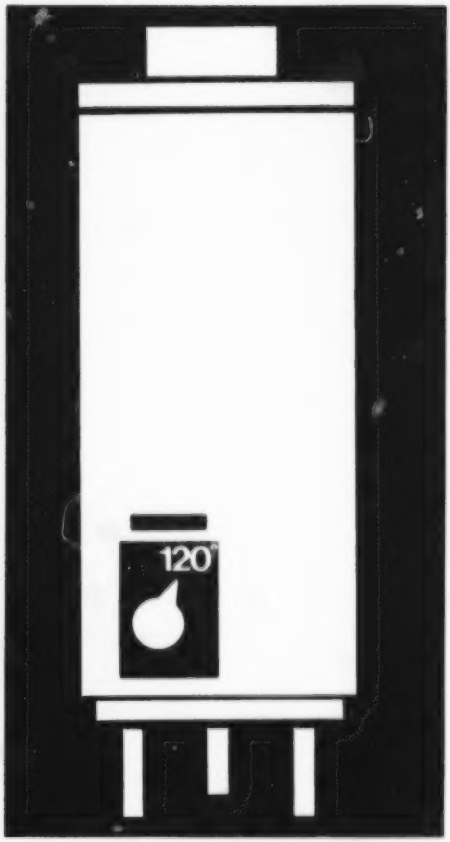
Energy-Efficiency Ratings for Air-Conditioners

If you're in the market for a room air-conditioner, you should be aware of the Energy Efficiency Rating (EER) numbers.

The EER rates the energy efficiency of similar appliances. The higher the EER number, the more efficient the appliance. The Federal Trade Commission requires that these numbers appear on appliances' Energy Guide labels.

Example: EER's for room air-conditioners can be as low as 5.4 and as high as 11.5. The 11.5-rated room air-conditioner is more than twice as efficient as the 5.4 unit of the same capacity and uses less than half the electrical energy.

Hot Water Energy Savers



Heating water accounts for about 20 percent of all the energy we use in our homes. Don't waste it.

- **Repair leaky faucets promptly.**
- **Do as much household cleaning as possible with cold water.**
- **Insulate your hot water storage tank and piping.**
- **Install aerators and low-flow shower heads.**

Water Heaters

Energy-efficient water heaters may cost a little more initially, but reduced operating costs can more than make up for the higher outlay. Check the Energy Guide label to help choose an energy thrifty heater.

- **Buy a water heater with thick insulation on the shell.** While the initial cost may be more than one without this conservation feature, the savings in energy costs over the years will more than repay you.
- **Add insulation around the water heater you now have if it's inadequately insulated,** but be sure not to block off needed air vents. That would create a safety hazard, especially with oil and gas water heaters. When in doubt, get professional help. When the water heater is well-insulated, you should save from $8 to $20 a year in energy costs, much more if it's located in an unheated area of the house.
- **Check the temperature on your water heater.** Most water heaters are set for 140°F or higher, but you may not need water that hot unless you have a dishwasher. A setting of 120°F can provide adequate hot water for most families. If you reduce the temperature from 140°F to 120°F, you could save over 18 percent of the energy used at the higher setting. Even reducing the setting 10 degrees will save more than 6 percent in water heating energy.
  To determine water temperature, draw water from the heater through the bottom faucet and test it with a thermometer.

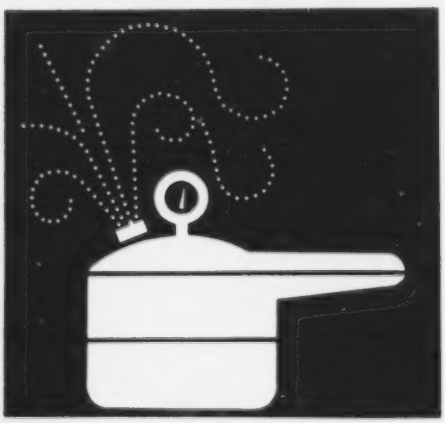
Energy Savers in the Kitchen, Laundry, and Bath

When buying appliances such as refrigerators, freezers, dishwashers, washing machines and dryers, compare the Energy Guide Labels of competing models of the same capacity to determine their annual energy cost ranges. Over time, the energy thrifty machines will be more economical purchases.

Kitchen Energy Savers

Cooking Energy Savers

- **Use cold water rather than hot to operate your food disposer.** This saves the energy needed to heat the water, is recommended for the appliance, and aids in getting rid of grease. Grease solidifies in cold water and can be ground up and washed away.
- **Install an aerator in your kitchen sink faucet.** By reducing the amount of water in the flow, you use less hot water and save the energy that would have been required to heat it. The lower flow pressure is hardly noticeable.



- **If you need to purchase a gas oven or range, look for one with an automatic (electronic) ignition system instead of pilot lights.** You'll save an average of up to a third of your gas use—41 percent in the oven and 53 percent on the top burners.
- **If you have a gas stove, make sure the pilot light is burning efficiently**—with a blue flame. A yellowish flame indicates an adjustment is needed.
- **Never boil water in an open pan.** Water will come to a boil faster and use less energy in a kettle or covered pan.
- **Keep range-top burners and reflectors clean.** They will reflect the heat better, and you will save energy.
- **Match the size of the pan to the heating element.** More heat will get to the pan; less will be lost to surrounding air.
- **If you cook with electricity, get in the habit of turning off the burners several minutes before the allotted cooking time.** The heating element will stay hot long enough to finish the cooking for you without using more electricity. The same principle applies to oven-cooking.

- **When using the oven, make the most of the heat from that single source.** Cook as many foods as you can at one time. Prepare dishes that can be stored or frozen for later use or make all oven-cooked meals.

- **Watch the clock or use a timer;** don't continually open the oven door to check food. Every time you open the door heat escapes and your cooking takes more energy.

- **Use small electric pans or ovens for small meals** rather than the kitchen range or oven. They use less energy.

- **Use pressure cookers and microwave ovens if you have them.** They can save energy by reducing cooking time.

- **When cooking with a gas range-top burner, use moderate flame settings to conserve gas.**

- **When you have a choice, use the range-top rather than the oven.**

Dishwashing Energy Savers

When buying a dishwasher, look for an energy-efficient model with air-power and/or overnight dry settings. These features automatically turn off the dishwasher after the rinse cycle. This can save you up to 10 percent of your dishwashing energy costs.

The typical dishwasher uses 14 gallons of hot water per load. Use it energy efficiently.

- **Scrape dishes before loading them into the dishwasher** so you won't have to rinse them. If they need rinsing, use cold water.

- **Be sure your dishwasher is full,** but not overloaded, when you turn it on.

- **Let your dishes air dry.** If you don't have an automatic air-dry switch, turn off the control knob after the final rinse. Prop the door open a little and the dishes will dry faster.

- **Don't use the "rinse hold" on your machine for just a few soiled dishes.** It uses 3 to 7 gallons of hot water each time you use it.

How to Save Electricity Before It Comes to You

During the late afternoon and early evening hours the load on the Nation's electrical systems usually reaches its peak. To meet the heavy demand, electric utilities often must use backup generating equipment that is not energy efficient.

- Try to use energy-intensive appliances such as dishwashers, clothes washers and dryers, and electric ovens in the early morning or late evening hours to help reduce that peakload.

If everyone scheduled household chores during offpeak hours, the utilities' daily fuel use would be reduced and the Nation's energy would be conserved.

Refrigerator/Freezer Energy Savers

- **Don't keep your refrigerator or freezer too cold.** Recommended temperatures: 38°F to 40°F for the fresh food compartment of the refrigerator; 5°F for the freezer section. (If you have a separate freezer for long-term storage, it should be kept at 0°F, however.)

- **Consider buying refrigerators and freezers that have to be defrosted manually.** Although they take more effort to defrost, these appliances use less energy than those that defrost automatically.

- **Regularly defrost manual-defrost refrigerators and freezers. Frost buildup increases the amount of energy needed to keep the engine running. Never allow frost to build up more than one-quarter of an inch.**

- **Make sure your refrigerator door seals are airtight.** Test them by closing the door over a piece of paper or a dollar bill so it is half in and half out of the refrigerator. If you can pull the paper or bill out easily, the latch may need adjustment or the seal may need replacing.

Laundry Energy Savers

You can save considerable amounts of energy in the laundry through conservation of hot water and by using your automatic washers and dryers less often and more efficiently.

- **Wash clothes in warm or cold water, rinse in cold.** You'll save energy and money. Use hot water only if absolutely necessary.

Washing Machines

- **Fill washers** (unless they have small-load attachments or variable water levels), but do not overload them.

- **Don't use too much detergent.** Follow the instructions on the box. Oversudsing makes your machine work harder and use more energy.

- **Pre-soak or use a soak cycle when washing heavily soiled garments.** You'll avoid two washings and save energy.

Clothes Dryers

- **Fill clothes dryers but do not overload them.**

- **Keep the lint screen in the dryer clean.** Remove lint after each load. Lint impedes the flow of air in the dryer and requires the machine to use more energy.

Heating Zone Map

Heating Zone Map

Recommended R-Values

Heating Zone	Attic Floors*	Exterior Walls	Ceilings Over Unheated Crawl Space or Basement
1	R-26	R-Value of full wall	R-11
2	R-26	insulation, which is	R-13
3	R-30	3½" thick, will depend	R-19
4	R-33	on material used.	R-22
5	R-38	Range is R-11 to R-13.	R-22

*If you already have R-11 or R-19 insulation on your attic floor, carefully evaluate the cost and potential energy savings of added insulation to determine whether it will be cost effective.

R-Values Chart

	Batts, Blankets, Boards		**Loose Fill (Poured In)		
	glass fiber	rock wool	glass fiber	rock wool	cellulosic fiber
R-11	3½"-4"	3"	5"	4"	3"
R-13	4"	4½"	6"	4½"	3½"
R-19	6"-6½"	5¼"	8"-9"	6"-7"	5"
R-22	6½"	6"	10"	7"-8"	6"
R-26	8"	8½"	12"	9"	7"-7½"
R-30	9½"-10½"	9"	13"-14"	10"-11"	8"
R-33	11"	10"	15"	11"-12"	9"
R-38	12"-13"	10½"	17"-18"	13"-14"	10"-11"

**R-value of rigid foamed boards is 5.2 per inch when new.

- **Keep the outside exhaust of your clothes dryer clean.** Check it regularly. A clogged exhaust lengthens the drying time and increases the amount of energy used.
- **If your dryer has an automatic dry cycle,** use it. Overdrying merely wastes energy.
- **Dry your clothes in consecutive loads.** Stop-and-start drying uses more energy because a lot goes into warming the dryer up to the desired temperature each time you begin.
- **Separate drying loads into heavy and lightweight items.** Since the lighter ones takes less drying time, the dryer doesn't have to be on as long for these loads.
- **If drying the family wash takes more than one load, leave small, lightweight items until last.** You may be able to dry them, after you turn off the power, with heat retained by the machine from earlier loads.
- **Save energy by using the old-fashioned clothesline.** As a bonus, clothes dried outdoors often seem fresher and cleaner than those taken from a mechanical dryer.

Ironing

- **Remove clothes that will need ironing from the dryer while they still are damp.** There's no point in wasting energy to dry them thoroughly if they only have to be dampened again.
- **You can save ironing time and energy by "pressing" sheets and pillow cases on the warm top of your dryer.** Fold them carefully, then smooth them out on the flat surface.
- **Save energy needed for ironing by hanging clothes in the bathroom while you're bathing or showering.** The steam often removes the wrinkles for you.

Bathroom Energy Savers

- **Take showers rather than tub baths,** but limit your showering time and check the water flow if you want to save energy. It takes about 30 gallons of water to fill the average tub. A shower with a flow of 3 gallons of water a minute uses only 15 gallons in 5 minutes. Assuming you use half hot and half cold water for bathing, you would save about 5 gallons of hot water every time you substitute a shower for a bath. Thus, if you substituted just one shower for one bath per day, you would save almost 2,000 gallons of hot water in a year.
- **Consider installing a flow controller in the pipe at the showerhead.** These inexpensive, easy-to-install devices restrict the flow of water to an adequate 3 to 4 gallons per minute. This can save considerable amounts of hot water and the energy used to produce them over a year's time. For example, reducing the flow from 8 to 3 gallons a minute would save the average family about $24 a year

Lighting Energy Savers

It's easy to use more light than you need.

More than 16 percent of the electricity we use in our homes goes into lighting. Most Americans overlight their homes, so lowering lighting levels is an easy conservation measure.

Indoor Lighting

- **Turn off lights in any room not being used.**
- **Light-zone your home and save electricity.** Concentrate lighting in reading and working areas and where it's needed for safety (stairwells, for example). Reduce lighting in other areas, but avoid very sharp contrasts.
- **To reduce overall lighting in non-working spaces,** remove one bulb out of three in multiple light fixtures and replace it with a burned-out bulb for safety. Replace other bulbs throughout the house with bulbs of the next lower wattage.
- **Consider installing solid state dimmers or hi-low switches** when replacing light switches. They make it easy to reduce lighting intensity in a room and thus save energy.
- **Use one large bulb instead of several small ones in areas where bright light is needed.**
- **Use long-life incandescent lamps only in hard-to-reach places.** They are less energy efficient than ordinary bulbs.
- **Need new lamps?** Consider the advantages of those with three-way switches. They make it easy to keep

lighting levels low when intense light is not necessary, and that saves electricity. Use the high switch only for reading or other activities that require brighter light.

- **Always turn three-way bulbs down to the lowest lighting level when watching television.** You'll reduce the glare and use less energy.
- **Use low-wattage night-light bulbs.** These now come in 4-watt as well as 7-watt sizes. The 4-watt bulb with a clear finish is almost as bright as the 7-watt frosted bulb but uses about half as much energy.
- **Try 50-watt reflector floodlights in directional lamps** (such as pole or spot lamps). These flood lights provide about the same amount of light as the standard 100-watt bulbs but at half the wattage.
- **Try 25-watt reflector flood bulbs in high-intensity portable lamps.** They provide about the same amount of light but use less energy than the 40-watt bulbs that normally come with these lamps.
- **Use fluorescent lights whenever you can; they give out more lumens per watt.** For example, a 40-watt fluorescent lamp gives off 80 lumens per watt and a 60-watt incandescent gives off only 14.7 lumens per watt. The 40-watt fluorescent lamp would save about 140 watts of electricity over a 7-hour period. These savings, over a period of time, could more than pay for the fixtures you would need to use fluorescent lighting. Some new high efficiency fluorescent lights fit into conventional lamps.
- **Consider fluorescent lighting for the kitchen sink and countertop areas.** These lights set under kitchen cabinets or over counter-tops are pleasant and energy efficient.
- **Fluorescent lighting also is effective for makeup and grooming areas.** Use 20-watt deluxe warm white lamps for these areas.
- **Keep all lamps and lighting fixtures clean.** Dirt absorbs light.
- **You can save on lighting energy through decorating.** Remember, light colors for walls, rugs, draperies, and upholstery reflect light and therefore reduce the amount of artificial light required.

Outdoor Lighting

- **Have decorative outdoor gas lamps turned off, unless they are essential for safety, or convert them to electricity.** Keeping just eight gas lamps burning year-round uses as much natural gas as it takes to heat an average-size home for a winter heating season.

  By turning off one gas lamp, you might save from $40 to $50 a year in natural gas costs.

- **Use outdoor lights only when they are needed.** One way to make sure they're off during the daylight hours is to put them on a photocell unit or timer that will turn them off automatically.

Appliance Energy Savers

About 8 percent of all the energy used in the United States goes into running electrical home appliances, so appliance use and selection can make a considerable difference in home utility costs. Buying an energy-efficient appliance may cost a bit more initially but that expense is more than made up by reduced operating costs over the lifetime of the appliance.

Energy efficiency may vary considerably though models seem similar. In the next few years it will be easier to judge the energy efficiency of appliances with the Government's appliance labeling program. (See page 21 for details.) In the meantime, wise selection requires a degree of time and effort.

You will find a number of tips on how to save energy when buying or using appliances in other sections of this booklet, but here are a few general ideas to consider.

- **Don't leave your appliances running when they're not in use.** It's a total waste of energy. Remember to turn off your radio, TV, or record player when you leave the room.
- **Keep appliances in good working order** so they will last longer, work more efficiently, and use less energy.
- **When buying appliances, read labels carefully.** Compare energy use information and operating costs of similar models by the same and different manufacturers. The retailer

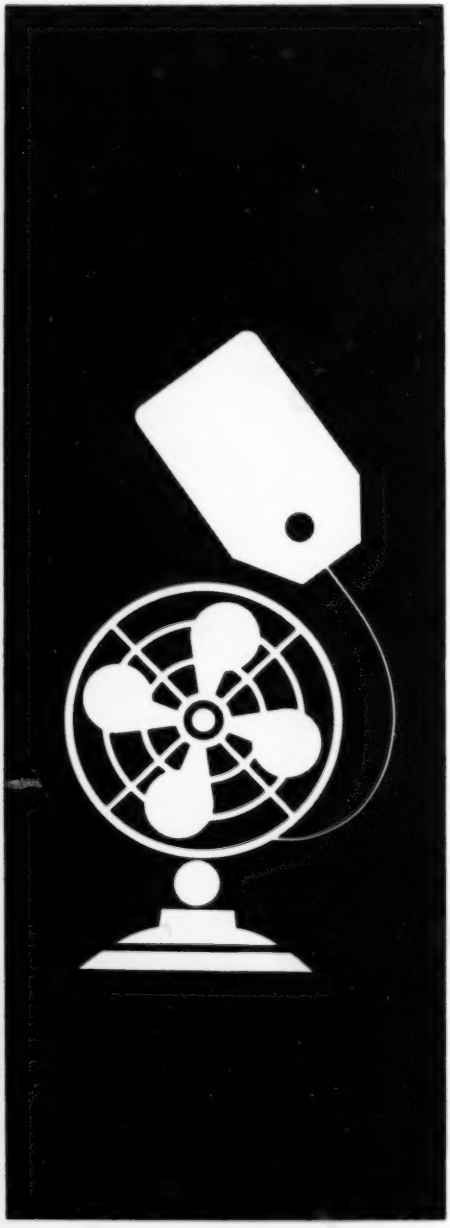
should be able to help you find the wattage of the appliance.

- **Before buying new appliances with special features, find out how much energy they use compared with other, perhaps less convenient, models.** A frost-free refrigerator, for example, uses more energy than one you have to defrost manually. It also costs more to purchase. The energy and dollars you can save with a manual-defrost model may be worth giving up the convenience.

- **Use appliances wisely;** use the one that takes the least amount of energy for the job. For example: toasting bread in the oven uses three times more energy than toasting it in a toaster.

- **Don't use energy-consuming special features on your appliances if you have an alternative.**

The Appliance Labeling Program



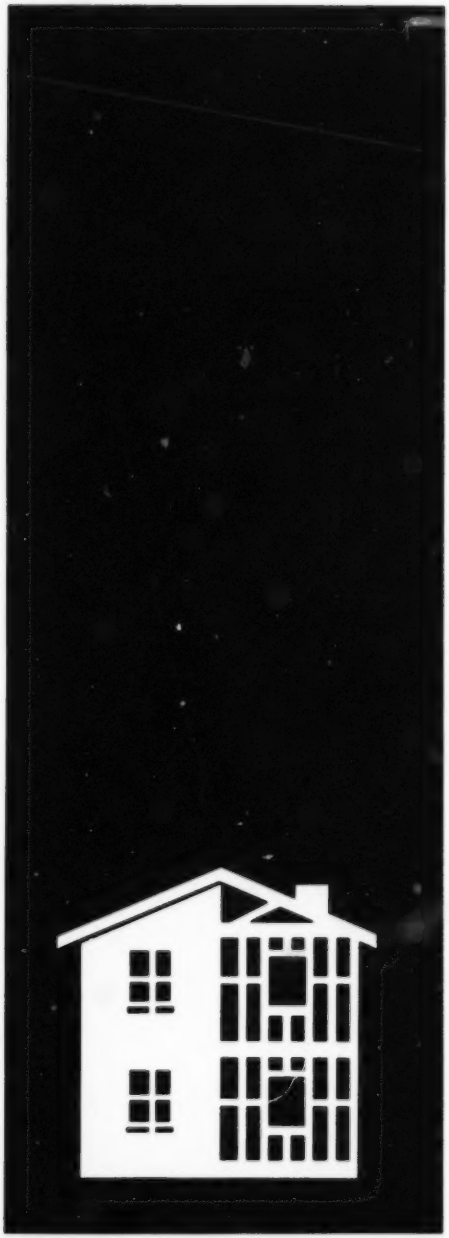
This labeling program is designed to help consumers shop for energy-saving household appliances and equipment. It has been developed by the Department of Energy and the Federal Trade Commission as a result of the Energy Policy and Conservation Act, signed into law on December 22, 1975.

Under the law, manufacturers must place labels showing estimated annual operating costs on all models of the following:

- Furnaces
- Water heaters
- Refrigerators and refrigerator freezers
- Clothes washers
- Dishwashers
- Room air-conditioners
- Freezers

A comparison of the energy ratings labels on competing appliances of the same capacity will help determine which model is most energy economical.

Building or Buying a Home



Energy-wasting mistakes can be avoided if you consider climate, local building codes, and energy-efficient construction when you build or buy a home. In either case, the following energy conservation ideas should help you keep down home utility bills.

When Building a Home . . .

- **Consider a square floor plan.** It usually is more energy efficient than a rectangular plan.
- **Insulate walls and roof to the highest specifications recommended for your area.***
- **Insulate floors, too, especially those over crawl spaces, cold basements, and garages.***
- **If the base of a house is exposed, as in the case of a mobile home, build a "skirt" around it.**
- **Install louvered panels or wind-powered roof ventilators** rather than motor-driven fans to ventilate the attic.
- **Consider solar heat gain when you plan your window locations.**

*See Heating Zone Map, pp. 14-15.

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In cool climates, install fewer windows in the north wall because there's little solar heat gain there in winter.

In warm climates, put the largest number of windows in the north and east walls to reduce heating from the sun.

- **Install windows you can open** so you can use natural or fan-forced ventilation in moderate weather.
- **Use double-pane glass throughout the house.** Windows with double-pane heat-reflecting or heat-absorbing glass provide additional energy savings, especially in south and west exposures.
- **Place your refrigerator in the coolest part of the kitchen,** well away from the range and oven.
- **Install the water heater as close as possible to areas of major use** to minimize heat loss through the pipes; insulate the pipes.
- **If you live in a warm climate, remember that light-colored roofing can help keep houses cooler.**

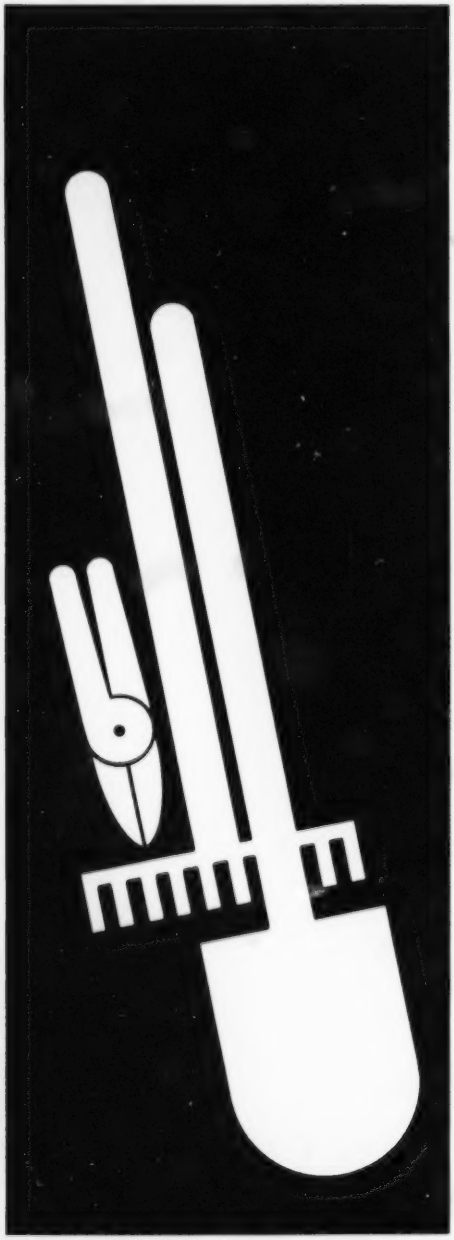
When Buying a Home . . .

- **Consider all the ideas mentioned for building a house.**
- **Ask for a description of the insulation and data on the efficiency of space heating, air-conditioning, and water heating plants,** or have an independent engineer advise you about the efficiency of the equipment. Ask to see the utility bills from the previous year but remember to adjust them for current utility rates. You may want to compare the bills of houses under consideration.
- **Consider the need for additional insulation or replacement of equipment.** Even some *new* houses don't have insulation in the exterior walls. Be sure to check. If improvements are necessary, you may want to seek an adjustment in the purchase price to cover all, or a reasonable share, of the costs.

Financial Incentives . . .

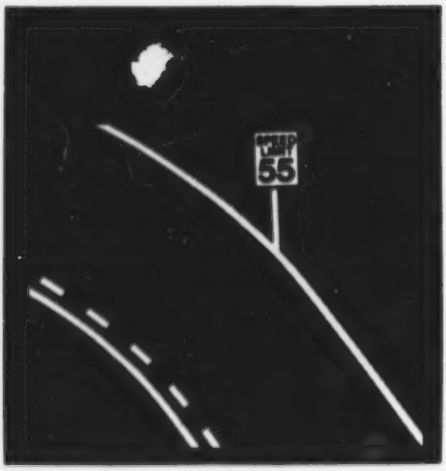
- When building or buying an energy efficient home, or retrofitting a home to increase energy efficiency, ask your lender for information about special financial terms or incentives that may be available.

Yard and Workshop Energy Savers



- **Plant deciduous trees and vines on south and west sides of the home** to provide shade in the summer and sunshine in the winter.
- **Do not allow gasoline-powered yard equipment to idle for long periods.** Turn off the equipment when you finish one job and restart it when you're ready to resume work.
- **Use hand tools, hand lawn mowers, pruners and clippers whenever possible.**
- **Maintain electrical tools in top operating condition.** They should be clean and properly lubricated.
- **Keep cutting edges sharp.** A sharp bit or saw cuts more quickly and therefore uses less power. Oil on bits and saws reduces friction and therefore also reduces power required.
- **Buy power tools with the lowest horsepower adequate for the work you want to do.**
- **Remember to turn off shop lights, soldering irons, gluepots, and all bench heating devices right after use.**

On the Road



In 1983 the average household spent about 24 percent more money for motor fuel than for household energy. Energy-conscious driving and good car maintenance can save $70-$100 a year in gasoline and diesel costs.

We can improve on our conservation efforts on the road. Here are some of the ways . . .

- **Use public transportation, a motorcycle, a moped, or a bicycle, or walk to work.**

- **Share your ride.** Join a carpool or a vanpool. About one-third of all private automobile mileage is for commuting to and from work. If the average occupancy (currently 1.3 people per commuter car) were increased by just 1 person, each commuter would reduce his costs, energy consumption, and driving stress. And the nationwide gasoline savings—which would reduce our reliance on more expensive imports—would be more than 600,000 barrels per day.

- **Eliminate unnecessary trips.** Can you find one driving trip per week that could be handled by telephone or combined with another trip?

- **Vacation at home this year.** Discover nearby attractions. But, if you are going away, remember to turn off lights, lower heating temperatures in winter, and turn off air-conditioning in summer.

- **Choose a hotel or campground close to where you live.** A nearby hotel or campground often can provide as complete and happy a change from routine as one that is hundreds of miles away.

- **Plan to stay in one place** if you vacation away from home. "Hopping around" takes transportation energy.

- **Take a train or a bus instead of the family car.** Save gasoline and relax.

- **Rediscover the pleasures of walking, hiking, and bicycling during your vacation.** They're the most energy-conserving means of transportation and the healthiest for most people.

- **Observe the 55-mph speed limit** on the highway. Most automobiles get about 20 percent more miles per gallon on the highway at 55 mph than they do at 70 mph.

- **Accelerate smoothly and moderately.** Achieve your desired speed quickly, and then keep a steady pressure on the accelerator, just enough to maintain speed.

- **Drive at a steady pace.** Avoid stop-and-go traffic. Frequently check the traffic situation well ahead of you. Adjust your driving to avoid unnecessary, wasteful accelerations and decelerations.

- **Minimize braking.** Anticipate speed changes. Take your foot off the accelerator as soon as you see a red light or slowed traffic ahead.

- **Don't let the motor idle for more than a minute.** Turn off the engine. It takes less gasoline to restart the car than it takes to let it idle. Generally there is no need to press the accelerator down to restart the engine.

- **Don't overfill your tank.** Remove the nozzle or ask the gas station attendant to remove it when the automatic valve closes. This will eliminate any chance of spillage.

- **Plan your trips carefully.** Select routes that will allow you to consolidate errands and avoid congested areas.

- **Use your head** before you drive. Plan your trips. Try to use these tips as you drive. Record your gasoline use, and try to get more miles per gallon out of your car.

Buying a Car

Study the Market Before You Buy

Ask your dealer for a free copy of the latest "EPA/DOE Gas Mileage Guide." Study the fuel economy figures and tables that compare specifications. Review mileage test results publicized by Consumers Union and motor industry magazines. Generally the best fuel economy is associated with low vehicle weight, small engines, manual transmissions, low axle ratio, and low frontal area (the width of the car times its height).

- **Buy the most energy-efficient car of the size and style you want.** Don't let the car price alone determine your choice. Make your decision on the basis of the combination of purchase price and your estimated fuel costs.

Choose Accessories Wisely

- **Purchase only the optional equipment and accessories you really need.** Items like air-conditioning, automatic transmission, and power steering require considerable energy, all of which is derived from burning gasoline. Other equipment, such as power brakes, electric motor-driven windows, seats and radio antennas, require less energy for their operation, but all accessories add to the vehicle weight—and this reduces fuel economy.

- **Don't buy an air-conditioner unless you really need it.** Even when you're not using it, it adds to the weight of the car.

- **If you have a car air-conditioner** or other power-draining accessories, use them sparingly.

Maintaining Your Car

Good car maintenance and a wise selection of accessories can mean fuel economy and dollars saved.

- **Have your car tuned** as needed. Regular tune-ups extend engine life and improve performance. A poorly tuned car could use as much as 3 to 9 percent more gasoline than a well-tuned one. The tune-up will pay for itself in gasoline savings and car reliability.

- **Keep the engine filters clean.** Clogged filters waste gasoline.

- **Use the gasoline octane and oil grade** recommended for your car. If you change the oil yourself, take the used oil to your service station for recycling.

- **Check tire pressures regularly.** Underinflated tires increase gas use. You can lose about 2 percent in fuel economy for every pound of pressure under the recommended pounds per-square-inch.

- **Consider radial tires.** They can mean from 3 to 5 percent improvement in gas mileage in the city, 7 percent on the highway, and 10 percent at 55 mph after the tires are warmed up for 20 minutes. And they last longer, too. Never mix radials with conventional tires.

- **Remove unnecessary weight from the car.** The lighter the car, the less gas it uses. An extra 100 pounds decreases fuel economy about 1 percent for the average car, 1¼ percent for small cars.

In the Marketplace

- **Try to buy products that will last.** More durable products save the energy that would be required to make replacements more often.

- **Buy equipment on the basis of initial cost plus operating costs rather than on the basis of purchase price alone.** Often products that are energy efficient cost more to buy. But over the lifetime of the equipment, you will more than make up the difference in lower operating costs.

- **Buy products made of recycled materials or those that can be recycled**—steel, aluminum, paper, and glass among others. More energy is used in the production of products from virgin materials than from recycled or reclaimed materials. For example, producing steel from scrap requires only one-quarter of the energy it would take when using virgin ores. Making a product from recycled aluminum requires less than 10 percent of the energy that would be needed for the same product made from the ore.

- **When you buy fabrics or garments, try to choose those that can be washed in cold water** and/or require little or no ironing.

- **When shopping for an unusual item, telephone ahead to see if the store has it.** If it doesn't, you save the energy and time of traveling there and being disappointed.

- **Give gifts with year-round benefits.** If you have appliances on your gift list, select long-lasting models that use the least amount of energy.

- **Don't buy motorized equipment or gadgets when hand-operated versions will do.**

- **Buy the household equipment that's right for you.** Purchasing the right equipment for your home and needs, using it wisely, and taking good care of it can reduce energy costs considerably.

- **Bigger isn't necessarily better.** Don't buy a larger or more powerful piece of equipment than you need. Whether it's a furnace, air-conditioner, or water heater, make sure its size and power are right for your home. Ask your dealer, a trade association, or a consumer-interest group for assistance in judging this factor.

- **Comparison shop when buying appliances.** Compare energy use information and operating costs of similar models by the same company and by different manufacturers.

DOE produces publications to fulfill a statutory mandate to disseminate information to the public on all energy sources and energy conservation technologies. These materials are for public use and do not purport to present an exhaustive treatment of the subject matter.

Energy conservation information also may be obtained from many sources. Among them:

- Your local utility, which can provide information specific to your region and may offer an energy audit service for your home.

- The Conservation and Renewable Energy Information Service
  P.O. Box 8900
  Silver Spring, MD 20907
  (800) 523-2929
  (800) 462-4983 in Pennsylvania
  (800) 233-3071 in Alaska and Hawaii

- National Appropriate Technology Assistance Service
  U.S. Department of Energy
  P.O. Box 2525
  Butte, MT 59702-2525
  (800) 428-2525
  (800) 428-1718 in Montana

- The State Energy Office operated by each State government.

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